

WHAT IS CLAIMED IS:

1. A method of electrochemically detecting presence of a nucleic acid having a particular sequence in a subject substance, comprising:

5       preparing first and second vessels, wherein in the second vessel, a solution of a nucleic acid binding reagent is dispensed, and at least the second vessel has a counter electrode on a bottom surface or a inside surface thereof;

10       inserting the subject substance into the first vessel;

      inserting a nucleic acid immobilized electrode having a conductor member and a nucleic acid probe immobilized on the conductor member, to the first  
15       vessel;

      making a hybridization reaction to occur in the first vessel;

      extracting the nucleic acid immobilized electrode from the first vessel and inserting it into the second  
20       vessel; and

      applying a predetermined voltage between the nucleic acid immobilized electrode and the counter electrode so as to measure an electrochemical signal of the nucleic acid binding reagent solution.

25       2. The method according to claim 1, wherein the hybridization reaction occur in a buffer solution having an ion strength in a range of 0.01 to 5 and a pH

in a range of 5 to 10.

3. The method according to claim 1, wherein a hybridization promoter is added to the hybridization system.

5           4. The method according to claim 1, further comprising:

          adding a denaturing which includes a thermal denaturation for denaturing a double stranded nucleic acid in the subject substance into single stranded type.

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5. The method according to claim 1, wherein the nucleic acid binding reagent solution acts on coupling between the nucleic acid probe and the subject substance to generate the electrochemical signal.

15           6. The method according to claim 1, further comprising:

          applying a voltage to the nucleic acid immobilized electrode to promote the hybridization reaction.

7. The method according to claim 1, wherein the first vessel and the second vessel are formed in a micro titer plate.

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8. The method according to claim 7, wherein a plurality of the first vessels and a plurality of the second vessels are formed in the micro titer plate.

25           9. The method according to claim 7, wherein there is only one of the counter electrode common to said plurality of each of the first vessels and the second

vessels.

10. The method according to claim 7, wherein the counter electrode is formed on the bottom surface or the inside surface of each of said plurality of the first vessels and the second vessels.

11. The method according to claim 1, wherein at least one of the first vessel and the second vessel each have a reference electrode.

12. The method according to claim 11, wherein the reference electrode is formed on a inside surface or a bottom surface of the vessel.

13. A method of electrochemically detecting presence of a nucleic acid having a particular sequence in a subject substance, comprising:

15 preparing first and second vessels, wherein in the second vessel, a solution of a nucleic acid binding reagent is dispensed, and at least the second vessel having a counter electrode on a bottom surface or a inside surface thereof;

20 inserting the subject substance into the first vessel;

inserting a nucleic acid immobilized electrode having a conductor member and a nucleic acid probe on the conductor member, to the first vessel;

25 making a hybridization reaction to occur in the first vessel;

extracting the nucleic acid immobilized electrode

from the first vessel and inserting it into a washing vessel;

washing the nucleic acid immobilized electrode in the washing vessel;

5 extracting the nucleic acid immobilized electrode from the washing vessel and inserting it to the second washing vessel; and

applying a predetermined voltage between the nucleic acid immobilized electrode and the counter  
10 electrode so as to measure an electrochemical signal of the nucleic acid binding reagent solution.

14. A nucleic acid detection apparatus for electrochemically detecting presence of a nucleic acid having a particular sequence in a subject substance,  
15 comprising:

a nucleic acid immobilized electrode having a conductor member and a nucleic acid probe immobilized on the conductor member;

a vessel configured to bring the nucleic acid  
20 probe and the subject substance into contact with each other;

a counter electrode formed on a bottom surface or inside surface of the vessel; and

an electric circuit configured to applying a  
25 voltage between the nucleic acid immobilized electrode and the counter electrode.

15. A nucleic acid detection vessel used in the

nucleic acid detection apparatus according to claim 14,  
comprising:

a vessel,

5 and a first electrode formed on the bottom surface  
or inside surface of the vessel, wherein the first  
electrode is used as the counter electrode.

16. A nucleic acid detection vessel according to  
claim 15, further comprising:

10 a second electrode formed on the bottom surface  
or inside surface of the vessel, wherein the second  
electrode is used as a reference electrode.